WE CLAIM:

1. A device for measuring dispersion of a link between two switching nodes of an optical network comprising:

a phase measuring unit for determining a first phase of a data signal received over said link on a first wavelength $\lambda 1$ and a second phase of said data signal received over said link on a second wavelength $\lambda 2$; and

a dispersion measurement controller for controlling operation of said phase measuring unit, and characterizing the dispersion of said link at a wavelength of interest $\lambda = (\lambda 1 + \lambda 2)/2$ based on said first and second phases.

2. A device as claimed in claim 1, wherein said phase measuring unit comprises:

a test dividing circuit for 1:n dividing a first and a second test clock extracted from said data signal received on said first and second wavelength, respectively, and providing a first and a second divided test clock;

means for determining a first and a second rotation signal indicative of the digital offset between said first and second divided test clocks with a respective frame start; and

a phase detector for measuring the phase of said first and second divided test clock with respect to a static reference to obtain said first and said second phases.

3. A device as claimed in claim 2 further comprising a reference dividing circuit for 1:n dividing a reference clock extracted from said data signal received on a reference wavelength and providing a divided reference clock, wherein said static reference is provided by said divided reference clock.

4. A device as claimed in claim 2, wherein said means for determining is a frame detector.

5. A device as claimed in claim 2, wherein said phase measuring unit further comprises an analog-to-digital converter for providing said first and said second phases to said dispersion measurement controller in a digital format.

6. A device as claimed in claim 3, further comprising:

a reference receiver for detecting said data signal received on said reference wavelength and extracting said reference clock;

a test receiver for detecting said data signal received on said first and second test wavelengths and extracting said first and second test clocks; and

a dispersion measuring card for accommodating said phase measuring unit and said receivers,

wherein each said receiver is provided with means for serial-to-parallel converting said data signal and providing same to said means for determining.

7. A device as claimed in claim 5, further comprising, on said card, a reference transmitter for modulating said data signal received over said reference wavelength and transmitting same to the node at the input of said link.

8. A device as claimed in claim 1, further comprising a memory for storing dispersion calibration data for said phase measuring unit.

9. A device as claimed in claim 8, wherein said memory further stores dispersion data calculated for said link.

10. A method for characterizing the dispersion of a link of an optical network comprising:

(a) transmitting over said link a data signal over a first test wavelength $\lambda 1$ and thereafter over a second test wavelength $\lambda 2$;

(b) at the output of said link, measuring a first phase of said data signal received on said first wavelength $\lambda 1$ and a second phase of said data signal received on said second wavelength $\lambda 2$; and

(c) characterizing the dispersion of said link at a wavelength of interest $\lambda=(\lambda 1 + \lambda 2)/2$ based on the difference between said first and second phases.

11. A method as claimed in claim 10 wherein said step (b) comprises:

1:n dividing a first and a second test clock extracted from said data signal received on said first and second test wavelengths, and providing a first and a second divided test clocks; and

comparing the phase of said first and second divided test clocks with a static reference to obtain said first and said second phases.

12. A method as claimed in claim 11, further comprising determining a first and a second rotation signal indicative of the time offset between said data signal received over said respective first and second wavelength.

13. A method as claimed in claim 12, wherein step of determining a first and a second rotation signal comprises:

serial-to-parallel converting said data signal received over said respective first and second wavelength to obtain a respective *n-bit* test word;

determining said first and said second rotation signal as the digital offset between said respective first and second divided test clock and the respective frame start.

14. A method as claimed in claim 11, wherein said static reference is provided by said data signal received on a reference wavelength λref, transmitted continuously over said link and synchronous with said $\lambda 1$ and $\lambda 2$.

15. A method as claimed in claim 11, wherein said step (c) comprises:

determining, from said first phase and said first rotation signal, a phase signal *phase_1*, indicative of the phase of said data signal when carried by said first test wavelength; and

determining, from said second phase and said second rotation signal, a phase signal *phase_2*, indicative of the phase of said data signal when carried by said first test wavelength.

16. A method as claimed in claim 15, further comprising calculating the dispersion parameter for said link at said wavelength λ as:

$$D(\lambda) = \frac{(phase\_2 - phase\_1)}{\lambda 2 - \lambda 1} \cdot \frac{1}{L},$$

wherein L is the length of said link.

17. A method as claimed in claim 16, further comprising calculating the dispersion slope S(λ).

18. A method as claimed in claim 10, further comprising repeating steps (a) – (c) for a plurality of first and second wavelengths pairs for determining the dispersion parameter and slope across the entire spectrum used in said network to obtain a link dispersion profile.

19. A method as claimed in claim 10, further comprising storing said dispersion profile in a database.

20. A method as claimed in claim 19, further comprising using said link dispersion profile for optimizing dispersion of said link.

21. A method as claimed in claim 10, further comprising repeating steps (a) to (c) by switching between said first and second wavelengths to obtain a plurality of measurements for all 2π/n phases of said test clock, to calibrate the dispersion measurements for a particular configuration of said link.